

# Haematology User Guide

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## **Location of Haematology Department**

The department is situated on the lower floor of the Pathology Building, at the rear of the Hospital.

Specimen Reception is on the lower reception floor, clearly signposted behind the patient reception desk.

All samples delivered out of the routine opening hours below must be placed in the refrigerator besides the specimen reception window

## **Opening Hours**

TGH 8.45am - 5.00pm Mon-Fri

TGH 8.45am – 12.30pm Sat

Biomedical Scientist on call at all other times

(Bleep 060 through hospital switchboard)

Dr. David M. Alderson, Consultant Haematologist	0161 746 2472
Ms. Judith Massey, Secretary	0161 746 2470
Dr. Patrick A. Carrington, Consultant Haematologist	0161 746 2490
Mrs Ann Winstanley, Secretary	0161 746 2855
Mr. Neil Laurie, Head Biomedical Scientist	0161 746 2491
Laboratory	0161 746 2493
Out of hours bleep number	060
Anticoagulant Service	
Sr Freda Sharpen	0161 746 2496 or bleep 102
Sr Karen Underwood	
S/N Ann Wright	

## **Haematology Clinics**

Anticoagulant	TGH <b>Mon am, Thurs pm, Fri am</b> AGH <b>Wed am</b> Clinics are nurse led although a Haematologist is available
General Haematology	TGH, Dr. D.M. Alderson, <b>Tues am</b> TGH, Dr. P.A. Carrington, <b>Mon pm</b> AGH, Dr. D.M. Alderson or Dr Carrington, <b>Thurs am</b>
Haematology Oncology	TGH, Dr. D.M. Alderson, <b>Wed am</b> TGH, Dr. P.A. Carrington, <b>Wed am</b>

## **Request Forms**

There is a combined Hospital Haematology/Chemistry request form for hand-written in-patient requests and a combined GP request form containing Chemistry, Haematology and Microbiology.

Electronic requesting should be used where available.

The patient's full name and date of birth must be clearly visible and legible on both request form and specimen.

## **Identification Criteria**

	<b>Essential</b>	<b>Desirable</b>
<b>Sample</b>	Patients full name or correctly coded identification Date of Birth Date collected	Time sample taken (sometimes essential) Hospital or NHS Number
<b>Request Form</b>	Patients full name or correctly coded identification Date of birth Sex of patient Report destination Requesting Consultant or GP (including computer code) Requesting Clinician Date collected Electronic record or NHS number	Clinicians bleep No Signature of requesting Clinician Patients address Clinical details Time collected

The doctor's name and report destination must be clearly printed to allow reports to be returned to the appropriate location.

Specimens must be placed into the attached bag and sealed correctly. Please see the Pathology Sample Acceptance Criteria for further details.

## **Collection and Transportation of specimens**

The 'Monovette' blood collection system, comprising a combined syringe/container and a needle with valve for multiple samples, is used. If difficulties are experienced, contact the laboratory.

Sharing of samples with other departments is not acceptable and may result in samples not being analysed for all tests.

## **Labelling for Danger of Infection**

All Pathology specimens and request forms MUST be transported in bags identified with the "Biohazard" logo. Specimen containers and transport bags must be securely sealed.

Each request form should include sufficient clinical information to enable laboratory personnel to adopt additional safety precautions should they be required. Any specimen sent from a patient with known or suspected HIV, Hepatitis B or C must have a yellow 'INOCULATION RISK' label affixed clearly to both the specimen container and request form.

Patients who have developed a fever within 21 days of having returned from Africa or other countries where Lassa Fever or other Viral Haemorrhagic Fevers occur or who through their work may have had contact with any of these viruses should be discussed with the department in Pathology before the collection or transport of specimens to establish a need for any special containment.

The majority of requests require no more than 7.5 ml. of blood. However, some tests may vary. For general enquiries please phone extension 2492/3.

### **Pneumatic Air Tube Transport System**

The following blood specimens must **not** be sent via the air tube:

- any specimen from patients known to have, or thought to have:
  - transmissible spongiform encephalopathy (CJD, GSS etc)
  - a viral haemorrhagic fever (eg Lassa, Ebola etc)

### **Specimen carriers**

Some areas of the hospital are served by porters who will carry samples to the laboratory but where this service is not available, it is essential that **anyone** carrying samples to the laboratory does so in accordance with the published laboratory guidelines - P04-005-F5 – "Guidelines for laboratory porters and messengers (including **all** staff carrying or handling samples for the laboratory)". Specific laboratory containers (sealed red boxes) are provided for the safe transport of specimens to the laboratory from within the hospital, so samples **must not be carried in the hand or in a pocket**.

Pathology and / or PCT transport services will collect samples from the PCT and other local hospitals on a daily basis.

### **Routine service**

Most results are available on the day of receipt of sample in the laboratory

### **Urgent service**

The majority of urgent samples will be analysed within one hour of receipt in the laboratory. This includes

- FBC including WBC differential
- Clotting tests – PT/INR, APTT, D-Dimer, Thrombin time & Plasma Fibrinogen

Processing of other urgent tests will commence within an hour of receipt but results may take up to two hours. This includes

- ESR and Screen for Malarial Parasites
- Haematinic requests will be analysed the next working day

## **Routine Investigations**

### **Full Blood Count (FBC) including Automated Differential Leucocyte Count**

2.7ml. blood EDTA (Red) tube required (minimum volume required is approximately 0.5ml)

Analysis includes Hb, PCV, MCV, MCH, MCHC, platelets WBC and WBC differential. Haematology analysers provide highly accurate automated differential counts for all five leucocyte populations. Blood films will normally be made at the discretion of the laboratory staff and/or Consultant Haematologist

<b>Test</b>	<b>Reference Range (Adult)</b>	<b>Stability (2 – 8°C)</b>	<b>Turnaround time</b>
RBC			
Male	4.46 – 5.54 x 10 <sup>12</sup> /L	2 days	4 hours
Female	3.87 – 5.51 x 10 <sup>12</sup> /L		
Haemoglobin			
Male	120 – 175 g/L	2 days	4 hours
Female	115 – 165 g/L		
Elderly	125 – 169 g/L		
Haematocrit			
Male	40 – 54%	2 days	4 hours
Female	37 – 47%		
MCV	80 – 98 fL	2 days	4 hours
MCH	27.0 – 34.0 pg	2 days	4 hours
MCHC	310 – 360 g/L	2 days	4 hours
RDW	11.8 – 14.8	2 days	4 hours
WBC	3.5 – 11.0 x 10 <sup>9</sup> /L	2 days	4 hours
Platelets	130 – 450 x 10 <sup>9</sup> /L	2 days	4 hours
Reticulocytes	21 – 81 x 10 <sup>9</sup> /L	2 days	4 hours
MPV	7.1 – 10.7 fL	2 days	4 hours
Neutrophils	1.7 – 7.9 x 10 <sup>9</sup> /L	2 days	4 hours
Lymphocytes	1.0 – 4.0 x 10 <sup>9</sup> /L	2 days	4 hours
Monocytes	0.2 – 0.8 x 10 <sup>9</sup> /L	2 days	4 hours
Eosinophils	0.04 – 0.4 x 10 <sup>9</sup> /L	2 days	4 hours
Basophils	0 – 0.1 x 10 <sup>9</sup> /L	2 days	4 hours

## Erythrocyte Sedimentation Rate (ESR)

2.7ml. blood EDTA (Red) tube required. The sample bottle **MUST** be correctly and fully filled to the top line with the plunger pulled to the bottom of the tube.

Under filled tubes may be rejected as insufficient for ESR testing

<b>Reference ranges</b>		<b>Stability (RT)</b>	<b>Turnaround times</b>
<b>Male</b>	age 17 - 50	0 - 10 mm/hr	
	51 - 60	0 - 12 mm/hr	
	61 - 70	0 - 14 mm/hr	
	71+	0 - 30 mm/hr	6 hours
<b>Female</b>	age 17 - 50	0 - 12 mm/hr	4 hours
	51 - 60	0 - 19 mm/hr	
	61 - 70	0 - 20 mm/hr	
	71+	0 - 35 mm/hr	

## Coagulation

### Suspected Bleeding Diathesis

Take a full history of present and past bleeding incidents and enquire about family history and drug ingestion.

## Coagulation Tests Available

<b>Test</b>	<b>Quantity</b>	<b>Tube Type</b>	<b>Ref Range</b>	<b>Stability (RT)</b>	<b>Turnaround Times</b>
Prothrombin Time (PT)	To mark exactly	Green (citrate)	10.3 – 12.5 seconds	8 hours	4 hours
APTT	To mark exactly	Green (citrate)	21.4 – 29.3 seconds	8 hours	4 hours
INR	To mark exactly	Green (citrate)	See guidelines below	8 hours	4 hours
Thrombin Time	To mark exactly	Green (citrate)	7.7 – 10.5 seconds	4 hours	4 hours
Fibrinogen Assay	To mark exactly	Green (citrate)	1.7 - 4.0 g/l	4 hours	4 hours

D-Dimer	To mark exactly	Green (citrate)	<500 µg/l	4 hours	4 hours
Lupus Anticoagulant	To mark exactly	Green x 4 (citrate)		4 hours	2 weeks
Thrombophilia Screen (Protein C & S, ATIII & APCR)	To mark exactly	Green x 6 (citrate)		4 hours	2-4 weeks (sent to referral laboratory)
Factor Assays	Contact Consultant Haematologist				

**Please note that under filled samples cannot be tested**

### **Patients taking Oral Anticoagulants**

These should be monitored by the international normalised ratio (**INR**). The therapeutic level 2.0 - 4.5 depends upon condition treated. An **INR** of within 0.5 units of target is generally satisfactory.

Indication	Target INR
Pulmonary Embolus	2.5
Proximal Deep Vein Thrombosis	2.5
Calf Vein Thrombosis	2.5
Recurrence of Venous Thrombo-embolism when no longer on Warfarin therapy	2.5
Recurrence of venous thrombo-embolism whilst on Warfarin therapy	3.5
Symptomatic inherited thrombophilia	2.5
Anti-Phospholipid syndrome	2.5
Non-rheumatic atrial fibrillation	2.5
Atrial fibrillation due to rheumatic heart disease	2.5
Congenital heart disease	2.5
Cardioversion	2.5
Mural thrombus	2.5
Cardiomyopathy	2.5
Mechanical prosthetic heart valve	3.5

## **Haemolytic Disorders**

Screening involves a blood count & film, reticulocyte count, direct antiglobulin (Coombs) test and serum haptoglobins (Haematology) and serum bilirubin (Chemical Pathology). Other tests should be discussed with the Consultant Haematologist.

## **Haemoglobinopathies**

A screen requires two EDTA (Red) specimens

Test	Quantity	Tube Type	Ref Ranges	Stability (2 – 8°C)	Turnaround Times
Sickle Cell Screen including Hb Variant & Thalassaemia Screening  Hb A <sub>2</sub> Hb F	2.7 ml.	1 x red EDTA required (can be shared with FBC)	1.5 – 3.2%  < 1%	1 week	3 working days
Serum Ferritin		Plain [brown]	10 – 186 ng/ml (Female)  30 – 284 ng/ml (Male)	1 week	1 working day

A low MCV is common in iron deficiency and thalassaemia. Beta thalassaemia traits are usually not anaemic but characteristically show a raised HbA<sub>2</sub> (>3.5%) and normal ferritin.

## **Malarial Parasites**

A fresh EDTA samples is required – less than four hours old. All requests for malaria should give details of the country visited, if West/Central Africa, date of return to UK and date of onset of symptoms are required. Requests without this information cannot be processed until this is obtained due to potential risk to staff handling samples. A blood count will be performed routinely with each request.

Sunquest ICE users please follow on screen instructions and complete the risk assessment

**Stability 4 hours      Turnaround time 4 hours**

## **Haematinic Assays**

The following tests are available

Serum Vitamin B<sub>12</sub>, Serum Folate & Serum Ferritin

<b>Test</b>	<b>Quantity</b>	<b>Tube Type</b>	<b>Ref Range</b>	<b>Stability (2 – 8°C)</b>	<b>Turnaround times</b>
Serum B12 and Folate	7.5 ml.	One plain brown tube required	B12 > 183 pg/ml Folate 4.6 – 18.7 ng/ml	1 week	1 working day
Serum Ferritin	7.5 ml	Plain brown (only 1 required if B <sub>12</sub> also required)	10 – 186 ng/ml (Female) 30 – 284 ng/ml (Male)	1 week	1 working day

**Miscellaneous Tests**

Test	Quantity	Tube Type	Ref Ranges (Adult)	Stability	Turnaround times
Glandular Fever (EBV) Screening Test	2.7 ml	1 x red EDTA (can be shared with FBC)	negative	24hrs if whole blood used. Plasma or serum can be fridged at 2-8°C for 48 hours or frozen at -20°C for longer periods	1 working day
Haptoglobin	7.5 ml	Plain (Brown)	0.45 – 1.99 g/L	1 week (2 – 8°C)	2 working days
Serum Erythropoetin	7.5 ml	Plain (Brown)	2 – 20 mu/ml	<b>EPO stability from venepuncture:</b> 0-8 hrs at room temp, air tight container, cell free sample 8-24 hrs at 2-8°C, air tight container, cell free sample Over 24hrs, frozen sample at -20°C	2 weeks (sent to specialised centre)
Plasma Homocysteine	2 x EDTA	EDTA (red)	0.0 – 16.0 umol/l	Plasma must be separated from cells within 1 hour of collection before freezing	2 weeks (sent to specialised centre)
Factor V Leiden genetic test (includes Prothrombin Gene Variant G20210A)	2 x 3.4 ml citrate	Citrate (green)		1 week (2 – 8°C)	2 weeks (sent to specialised centre)
HFE gene typing (Haemachromatosis C282Y, H63D)	2 x EDTA	EDTA (red)		1 week (2 – 8°C)	2 weeks (sent to specialised centre)
Chromosome Studies*	5-10 ml	Heparin (Orange) 1ml if		Must arrive in referral laboratory within 48 hours	Urgent 7 working days Routine 28

		paediatrics		of collection	working days
Other DNA tests*	2 x EDTA (1ml if paediatric)	EDTA (red)		1 week (2 – 8°C)	1 – 6 weeks depending on the nature and complexity of the tests

\*accompanied by appropriate request forms available from the laboratory

Other specialised Tests by arrangement with the laboratory or Consultant Haematologist.

All quoted turnaround times are approximate and are timed from receipt in the laboratory in either hours or working days (working weeks for sendaway tests)

## **Referred Work**

Although the majority of samples are processed in the laboratory at Trafford, some less frequently requested or highly specialised tests are referred to other hospitals. All referral laboratories are full CPA accredited and reports of these tests state the referral laboratory used.

The most commonly used laboratories are

Molecular Diagnostics Centre	Department of Haematology	Cytogenetics Department
Manchester Royal Infirmary	Manchester Royal Infirmary	St Mary's Hospital
Manchester	Manchester	Hathersage Road
M13 9WL	M13 9WL	Manchester
		M13 0JH

Oncology Cytogenetics	Haemostasis Laboratory
Christie Hospital	Specialist Haematology
Wilmslow Road	Block 32
Manchester	St James's University Hospital
M20 4BX	Beckett Street
	Leeds
	LS9 7TF

## **Quality Assurance Programmes**

As part of our on-going commitment to Quality and service improvement, we participate in all appropriate National External Quality Assurance schemes for Haematology.

### **Internal Quality Control**

Comprehensive internal quality control procedures are followed in Haematology, covering all aspects of work in the laboratory.

### **References**

<b>Title</b>	<b>Source</b>
Safe Working and the prevention of infection in clinical laboratories and similar facilities 2003	Health Services Advisory Committee
Disinfection, decontamination and biological spillage procedure	Pathology management procedure
Pathology Quality Manual	Trafford Healthcare NHS Trust
A Practical Guide to Accreditation in Laboratory Medicine	David Burnett
Standards for the Medical Laboratory	Clinical Pathology Accreditation (UK) Ltd